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# *Information Bulletin*

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## *Grade 9 Mathematics 1996-97*

This document was written primarily for:

Students	✓
Teachers	✓
Administrators	✓
Parents	
General Audience	
Others	✓ Superintendents

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This bulletin contains general information about the Provincial Student Assessment program and information specific to the Grade 9 Mathematics Achievement Test. **This bulletin replaces all previous bulletins.**

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**October 1996**



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# Looking Back: Highlights of 1996

## Grade 9 Mathematics

This information provides teachers, school administrators, and the public with an overview of the results for the June 1996 Grade 9 Mathematics provincial assessment. It complements the detailed school and jurisdiction reports.

### Who Wrote the Test?

All students registered in Grade 9 were expected to write the 1996 Mathematics Achievement Test. A total of 33 624 students wrote the test. In 1996, only a small proportion of students in Grade 9 did not write the test: 4.8% were absent and 3.2% were excused from writing by their superintendent.

### What Was the Test Like?

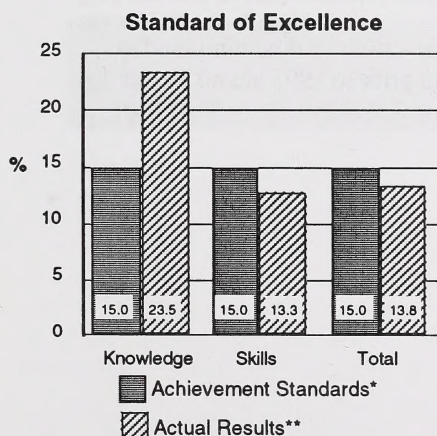
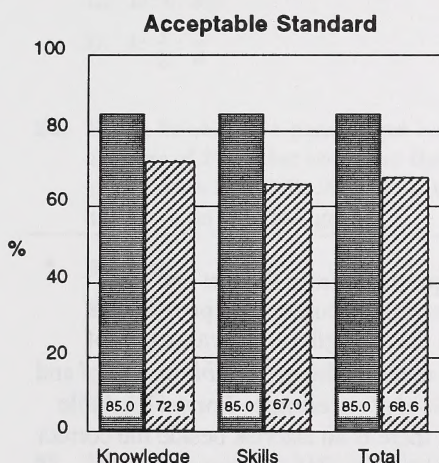
The test had 55 questions in five content areas: Number Systems and Operations, Ratio and Proportion, Measurement and Geometry, Data Management, and Algebra. The questions were classified in two reporting categories: Knowledge and Skills.

The test was divided into two parts. The first part had 45 multiple-choice questions, each with four alternatives. Students recorded their responses to questions on a separate answer sheet. The second part had 10 numerical-response questions, that required students to calculate the answer and then record it on the separate answer sheet.

### How Well Did Students Do?

As shown by the graphs, the number of students meeting the *acceptable standard* was lower than expected. The difficulties that students have in mathematics is most evident in questions requiring application. Students were more successful with knowledge questions. The number of students meeting the *standard of excellence* was higher than expected in the knowledge component and lower than expected in the skills component.

In 1.6% of the schools, the percentage of students meeting the *acceptable standard* was significantly above expectations for the province. In 40.9% of the



\*the percentage of students in the province expected to meet the acceptable standard and the standard of excellence

\*\*the percentage of students in the province who met the standards (based on those who wrote)

schools, the percentage of students meeting the *acceptable standard* was not significantly different from provincial expectations. This is an increase of 3% over last year's results. In 57.4% of schools, the percentage of students meeting the *acceptable standard* was significantly below provincial expectations. Schools where fewer than five students wrote the Grade 9 test are not included in these school calculations.

These results are based on scores achieved by all students writing in English. Results for students writing in French will be reported separately.

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### ***Commentary and Sample Questions from Grade 9 Mathematics Achievement Test 1996***

#### **Low Results in Mathematics**

The low percentage of students meeting the *acceptable standard* on the Grade 9 Mathematics Achievement Test continues to be a concern. Even with maintaining the improvement shown in 1995, results followed a similar pattern to those in 1992.

#### **Standardizing Numerical-Response Form**

An issue regarding the format of answer sheets for numerical-response questions has occurred: some students had difficulty filling in answers for the numerical-response questions on the achievement test answer sheet. To address this problem, a form similar to that used for the diploma mathematics exams will be used for the 1997 achievement test. The answer sheets will be scanned for variations in coding answers in the same manner as answer sheets for diploma exams.

### ***Has Achievement Changed Since Last Year?***

A study of changes in achievement was conducted as part of the provincial assessment. Results indicate that mathematics achievement in 1996 is about the same as in 1995.

Sample questions from the test and accompanying discussion are provided to highlight the strengths and weaknesses of students meeting the *acceptable standard* and the *standard of excellence*. For each sample question, there is an asterisk beside the correct answer.

All Achievement tests administered in 1993 and prior to 1993 are no longer secured.



6. In order to make a particular shade of green paint, Mary uses 24 parts of blue pigment, 12 parts of white, and 6 parts of yellow. What is the simplest ratio of these pigments?

\* A. 4:2:1  
B. 6:3:2  
C. 12:6:3  
D.  $1: \frac{1}{2}: \frac{1}{4}$

24. Nadia bowled five games and had an overall average of 205. Her scores on the first four games were 205, 203, 187, and 216. What was her score on the fifth game?

\* A. 214  
B. 203  
C. 202  
D. 162

32. The 3-digit number  $2M3$  is added to 326 to give another 3-digit number,  $5N9$ . If  $5N9$  is divisible by 9, then  $M$  is

A. 12  
B. 6  
C. 4  
\* D. 2

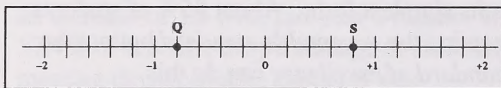
## Acceptable Standard

**Question 6** required students to express a ratio in its simplest form. About 85% of students meeting the *acceptable standard* but not the *standard of excellence* can do this.

**Question 24** required students to apply the meaning of average to solve a practical problem. Of students meeting the *acceptable standard* but not the *standard of excellence*, 89% can do this.

**Question 32** required students to apply divisibility rules to solve a place value problem. About 55% of the students meeting the *acceptable standard* but not the *standard of excellence* answered this question correctly.

Use the following information to answer question 33.



33. The rational numbers located at points Q and S respectively are

- \* A.  $-0.8$  and  $+0.8$
- B.  $-1.2$  and  $+0.8$
- C.  $-1.2$  and  $+1.2$
- D.  $-0.4$  and  $+0.4$

Use the following information to answer question 28.

A group of people are forming equal teams to play a game. When they form groups of 2, 3, 4, 5, or 6, there is always one person left.

28. What is the least number of people that could be in the group?

- A. 13
- \* B. 61
- C. 103
- D. 121

Question 33 required students to relate rationals and points on a number line. Of the students meeting the *acceptable standard*, 84% can do this.

Overall, results show that students who met the *acceptable standard* but not the *standard of excellence* were able to solve basic problems involving

- working with number lines (question 33)
- working with scientific notation
- using simple proportion (question 6)
- estimating
- recognizing geometric constructions
- solving exponential equations

These students had difficulty

- using patterns to solve problems
- manipulating a formula with two variables (question 32)
- knowing the meaning of terms such as range, probability, median
- solving inequality conditions
- solving complex problems

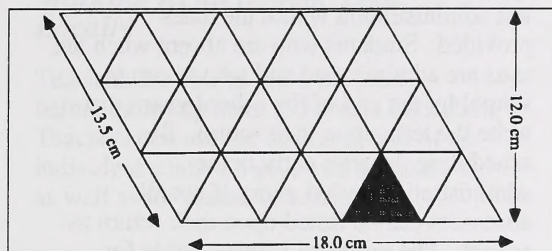
## Standard of Excellence

The following commentary highlights the skills and knowledge of students who met the *standard of excellence*.

Question 28 required students to apply lowest common multiple in problem solving. Students achieving the *standard of excellence* could solve this question.



**NR8.** A patterned tile is made in the shape of a parallelogram, as shown below. On this Numerical-response tile, there is a pattern made up of equilateral triangles, one of which is shaded.



What is the area in square centimetres of the shaded equilateral triangle?

**Answer: 9**

**Numerical-response question 8** required students to analyze a geometric pattern and calculate the area of one part of the pattern. Most of the students achieving the *standard of excellence* answered this question correctly.

Students who met the *standard of excellence* demonstrated more success than did other students when answering questions that required applying mathematical concepts in novel or new contexts. Specifically, students meeting this standard could

- use patterns to solve problems (NR8)
- solve place value problems involving divisibility rules
- apply lowest common multiple in problem solving (question 28)
- solve multistep problems

### ***Reporting the Results***

On August 23, 1996, each school jurisdiction received electronically, a district report and individual school reports regarding their students' achievement, as well as guidelines for interpreting these results in relation to provincial standards.

To facilitate reflection on school programs, we expect that results will be shared with all school staff (not just teachers of grades 3, 6, and 9), as well as with parents and the community.

Two copies of an individual profile for each student will be sent to the school that the student will attend in September. We expect that the Parent Copy will be given to be parents and the School Copy will remain with the student's record.

# Looking Ahead: What is Upcoming for 1997

## General Information

The Provincial Student Assessment Program provides teachers, parents, students, school administrators, Alberta Education, and the public with information about what students know and can do in relation to provincial standards. Group results are reported at school, district, and provincial levels to improve learning opportunities for students.

The assessments are administered in two subject areas at Grade 3—language arts and mathematics—and in four subject areas at grades 6 and 9—language arts, mathematics, social studies, and science.

The assessments are based on provincial standards, which reflect important learnings in the subject areas listed above. Classroom teachers from across the province are extensively involved in developing and field testing the assessment instruments.

## Administering the Assessments

Information about the nature of the provincial assessments as well as their administration to special needs students can be found in the *General Information Bulletin, Provincial Student Assessment Program*, which is mailed each fall to all superintendents and principals.

## Schedule

The written-response component of English and French Language Arts will be administered during the last week of May. The machine-scorable component of all achievement tests will be administered during the last two weeks of June. Specific information regarding scheduling is provided in the current *General Information Bulletin, Provincial Student Assessment Program*.

To minimize any risks to security, we recommend that all students complete the

test on the same day. Superintendents approve a local schedule for achievement test administration within the dates provided. Students who are absent when the tests are administered and who return to school by the end of the school year must write the tests upon their return. By scheduling the tests early in the administration period, most, if not all, absentees can be tested upon their return to school. The principal is responsible for ensuring the security of the tests.

The tests that will be administered each year are:

### Grade 3

English Language Arts (*Part A: Writing and Part B: Reading*)  
Mathematics (English and French forms)

### Grade 6

English Language Arts (*Part A: Writing and Part B: Reading*)  
Français 6<sup>e</sup> année (*Partie A: Production écrite and Partie B: Lecture*)  
Mathematics (English and French forms)  
Science-Revised Program (English and French forms)  
Previous Program (French forms only)  
Social Studies (English and French forms)

### Grade 9

English Language Arts (*Part A: Writing and Part B: Reading*)  
Français 9<sup>e</sup> année (*Partie A: Production écrite and Partie B: Lecture*)  
Mathematics (English and French forms)  
Science (English and French forms)  
Social Studies (English and French forms)

## Students in French Programs

All students in French programs must write English Language Arts, French Language Arts and French versions of other achievement tests if their language of instruction is french. Alberta Education will send a checklist to schools in January



requesting an indication of how many English or French tests are required. These forms must be returned through jurisdiction offices by mid-February.

### ***Marking Achievement Tests Locally***

Teachers are able to mark the tests before returning them to Alberta Education. Teachers can use the results as part of an individual student's year-end assessment, as well as for planning instruction.

### ***Performance Assessments***

Performance assessments provide students with real-life tasks. These assessments address many of the learner expectations that cannot be easily measured using only paper and pencil strategies.

These tasks have been developed by classroom teachers and are designed to model good classroom instruction and assessment practices.

The Student Evaluation Branch uses these tasks to collect a broader base of information about what students know and can do than achievement tests alone can provide. These assessments will be administered to a provincial sample of students in all subjects on a rotating basis. The following assessments will be given in 1997:

#### **Grade 3**

- informational book tasks in language arts

#### **Grade 6**

- social studies: inquiry into basic needs

#### **Grade 9**

- problem-solving and communication tasks in science

## ***Standards: Curriculum, Assessment, Achievement***

The move toward results-based curricula has re-emphasized the need for a clear delineation of standards and their purpose. All standards and all methods of setting standards require judgement.

The process of setting a standard can only be as good as the judgements that go into it. The standard will depend on whose judgements are involved in the process. In this sense, all standards are subjective. Yet once a standard has been set, the decisions based on it can be made objectively. Instead of a separate set of judgements for each test-taker, you will have the same set of judgements applied to all test-takers. Standards cannot be objectively determined, but they can be objectively applied.<sup>1</sup>

### ***Definitions***

The Achievement Testing Program is directly concerned with three different but related standards. These provincial standards are curriculum standards, assessment standards, and achievements standards. Local targets are also described in this section.

- **Curriculum Standards** are the expected student learnings sequenced into grade levels. They include broad statements of knowledge, skills, and attitude expectations against which student performance is judged. These standards are established in the process of curriculum development and are found in the *Program of Studies* document produced for each subject.

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<sup>1</sup> Passing Scores; Samuel A. Livingston, Michael J. Zieky; Educational Testing Service, 1982.

- **Assessment Standards** are the criteria adopted for judging actual student achievement relative to curriculum standards. They are ultimately expressed and applied to test scores. They are derived from answers to questions such as: What scores must a student obtain or how many questions on a given test must a student answer correctly in order for his/her performance on the test to be judged as acceptable or excellent?
- **Achievement Standards** are judgements that specify what percentages of students are expected to achieve an acceptable and an excellent level of achievement in relation to each course of studies, i.e. to the relevant curriculum standards. It is important to point out that this judgement is not a prediction of the percentage of students who will actually achieve acceptable or excellent levels, but rather a specification of the percentage of students at a given grade or year in school who are *expected* to achieve the acceptable (85%) or excellent standard (15%). **The 85% of students expected to meet the acceptable standard includes those students who meet the standard of excellence.** These standards apply to school, jurisdiction, and provincial performance.
- **Local targets** are goals set in schools/districts to focus plans for helping students learn what is expected by the provincial government. These local targets reflect the specific needs of students, the views of teachers, school administration, and the local community, and the resources available to provide learning opportunities for students.

## Confirming Standards

Confirming standards is a process whereby judgements about students' performance on the assessment are made in relation to provincial standards. For more information on confirming standards procedures, refer to Appendix A of the *Achievement Testing Program Provincial Report, June 1993*

*Administration.* For information on the selection of teachers for participation in the confirming standards process, refer to the current *General Information Bulletin, Provincial Student Assessment Program*.

## Purpose of Assessment Standards

The provincial standards are the basis upon which we assess how well students have learned mathematics by the end of Grade 9. These standards reflect the essential learnings that all Alberta students are expected to achieve. Provincial standards are useful, therefore, for assessing Grade 9 students in all types of school programs—public, private, and home education. By comparing actual results with provincial standards, decisions can be made about whether achievement is, in fact, “good enough.”

## Description of the Mathematics Assessment Standards

The following statements describe what is expected of Grade 9 students who are meeting the *acceptable standard* or the *standard of excellence* on independent work at the end of the Grade 9 Mathematics program. The statements represent the standards against which student achievement will be measured.

## Acceptable Standard

Students who meet the *acceptable standard* in Grade 9 Mathematics are expected to have a basic understanding of concepts and procedural knowledge, and problem-solving applications. They are expected to demonstrate understanding in concrete, pictorial, and symbolic modes, and to be able to translate from one mode to another. For example, students meeting the *acceptable standard* should know that the solution to the equation  $4(x + \frac{1}{2}) = -3$  is  $-\frac{5}{4}$  and be able to demonstrate their understanding by explaining how this solution can be arrived at and what it means for the solution to be  $-\frac{5}{4}$ .



They are able to communicate and verify the solution in any of the three modes.

To meet the *acceptable standard*, students are expected to explore problems and describe results using graphical, numerical, physical, algebraic, and verbal mathematical models of representation.

Students meeting the *acceptable standard* are expected to perform the mathematical operations and procedures that are fundamental to mathematics in Grade 9 and apply what they know in solving straightforward problems in familiar settings. They are able to describe the steps they used to solve a particular problem and to verify and defend their solution to the problem.

The expectation is that students meeting the *acceptable standard* have a positive attitude about mathematics and a sense of personal competence in using mathematics. They are able to demonstrate confidence when using common mathematical procedures and when applying problem-solving strategies in familiar settings.

### ***Standard of Excellence***

Students who meet the *standard of excellence* in Grade 9 Mathematics are expected to have a superior understanding of mathematical concepts, related procedural knowledge, and novel problem-solving situations. They are comfortable demonstrating their understandings in concrete, pictorial, or symbolic forms of representation. For example, they are able to show that a triangle maintains its shape and its size whenever it is reflected in either of the coordinate axes. They are able to demonstrate this property by taking measurements off a relevant drawing, by using the properties of congruent triangles, and by using the length properties of segments on Cartesian grids. They are able to create and generalize problem situations to illustrate concepts and to analyze and explain relationships among concepts.

To meet the *standard of excellence*, the students are expected to model mathematical situations clearly, using oral, written, concrete,

pictorial, graphical, and algebraic methods. They are expected to understand mathematical questions presented with objects, diagrams, or symbols in both common and unusual contexts.

Students meeting the *standard of excellence* are expected to perform the mathematical operations and procedures that are fundamental to mathematics in Grade 9 and to be able to apply mathematical thinking and modeling to solve and create non-routine problems. They are able to clearly describe the steps that they or other students used to solve a particular problem and can suggest alternative procedures and/or solutions. They are able to generalize solutions and strategies to new problem situations.

Students meeting the *standard of excellence* should have a positive attitude toward mathematics and show confidence in using mathematics meaningfully. They are expected to be self-motivated risk-takers who persevere when solving novel problems. They take initiative in trying new methods and are creative in their approach to problem solving.

# **Grade 9 Mathematics Assessment**

## **General Description**

The Grade 9 Mathematics Achievement Test consists of two parts:

- The first part has 45 multiple-choice questions, each with a value of one mark
- The second part has 10 numerical-response questions, each with a value of one mark

The questions are integrated in narrative themes.

The assessment is designed to be completed in 75 minutes. However, additional time of up to 30 minutes may be provided to allow students to finish.

The blueprint for the assessment is on the next page of this bulletin and is followed by practice questions that teachers can use with students to help them prepare for the provincial assessment.

Students will require HB pencils, rulers, protractors, and erasers.

Scientific Calculators are recommended.

The 1997 Grade 9 Mathematics Achievement Test uses approximately two-thirds of the previous year's Achievement Test items and one-third new items. The Achievement Test will reflect learning outcomes in mathematics expected of students at the end of Grade 9.

## **Reporting Categories Indicators**

The following points briefly highlight the learnings for each reporting category.

### **Knowledge**

- recalls facts, concepts, terminology
- knows procedures for algorithms and computations, and for using formulas
- knows procedures for constructions, measurements, conversions, and order of operations
- knows mental computation and estimation strategies
- knows how to use calculators and computers

### **Skills**

- applies basic mathematical concepts in familiar and unfamiliar situations
- demonstrates relationships among number systems, operations, number forms (fractions, decimals, powers, etc.), and concrete, pictorial, and symbolic representation
- demonstrates and applies relationships within equations and formulas
- demonstrates and applies relationships among geometric forms in a variety of situations
- demonstrates relationships between numbers and geometric forms
- uses a variety of strategies to solve problems
- applies data management skills to solve problems.
- judges the reasonableness of a solution



## Blueprint

The blueprint for mathematics shows the content strands and reporting categories under which questions are classified. The number of questions in each category is approximate.

Reporting Categories	Knowledge	Skills	Total Number of Questions/%
<b>Number Concepts and Operations</b> <ul style="list-style-type: none"> <li>Explain and illustrate the structure and the interrelationship of the sets of numbers within the rational number system</li> <li>Develop a number sense of powers with integral exponents and rational bases</li> <li>Use a scientific calculator or a computer to solve problems involving rational numbers</li> <li>Explain how exponents can be used to bring meaning to large and small numbers, and use calculators or computers to perform calculations involving these numbers</li> </ul>	5	12	17 (30%)
<b>Patterns and Relations</b> <ul style="list-style-type: none"> <li>Generalize, design, and justify mathematical procedures, using appropriate patterns, models, and technology</li> <li>Solve and verify linear equations and inequalities in one variable</li> <li>Generalize arithmetic operations from the set of rational numbers to the set of polynomials</li> </ul>	5	10	15 (27%)
<b>Shape and Space</b> <ul style="list-style-type: none"> <li>Use trigonometric ratios to solve problems involving a right triangle</li> <li>Describe the effects of dimension changes in related 2-D shapes and 3-D objects in solving problems involving area, perimeter, surface area, and volume</li> <li>Specify conditions under which triangles may be similar or congruent, and use these conditions to solve problems</li> <li>Use spatial problem solving in building, describing, and analyzing geometric shapes</li> <li>Apply coordinate geometry and pattern recognition to predict the effects of translations, rotations, reflections, and dilations on 1-D lines and 2-D shapes</li> </ul>	4	8	12 (23%)
<b>Statistics and Probability</b> <ul style="list-style-type: none"> <li>Collect and analyze experimental results expressed in two variables, using technology, as required</li> <li>Explain the use of probability and statistics in the solution of complex problems</li> </ul>	4	7	11 (20%)
<b>Total Number of Questions/%</b>	18 (33%)	37 (67%)	55 (100%)

## *Practice Questions*

The following suggestions are to help teachers administer the practice questions in the same way that the test will be administered.

Teachers are encouraged to familiarize their students with the kinds of questions that will appear on the achievement test by having them work through the practice questions.

These practice questions appeared in the June 1996 mathematics test. All other questions from the June 1996 test remain secured. Please note that this collection of questions does not represent the test emphasis as presented in the blueprint.

A practice answer sheet for the numerical-response questions is provided so that students can familiarize themselves with this form.

A table of the key and descriptors for the sample questions follows the questions on page 23.

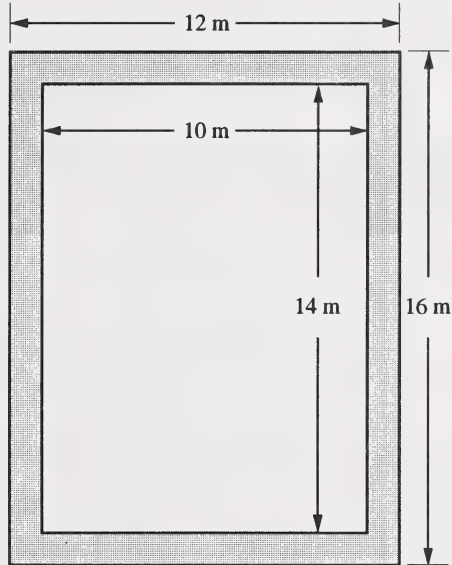
The practice questions on pages 12 to 22 appeared on the June 1996 achievement test (all other questions on this test are secured). These released questions, along with questions from previous bulletins, can be used to prepare students for the current achievement test.



## HOME IMPROVEMENTS

Use the following information to answer questions 1 and 2.

The shaded region of this diagram represents the top view of a trench that a contractor dug.



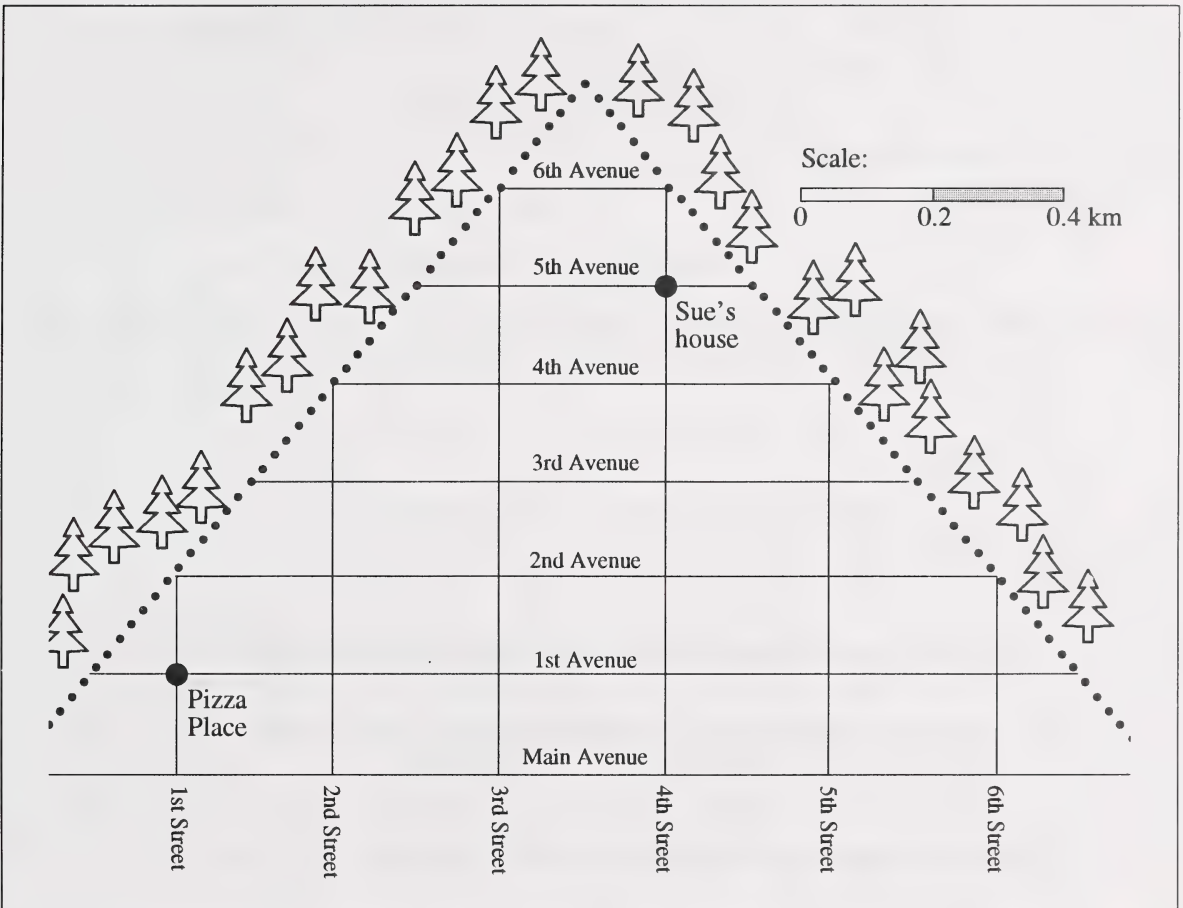
1. If the contractor removed  $104.5 \text{ m}^3$  of dirt from the trench, the depth of the trench to the nearest tenth of a metre is
  - A. 26.1 m
  - B. 2.0 m
  - C. 0.7 m
  - D. 0.5 m

2. The contractor was required to cover the bottom of the trench with plastic before further construction could be done. If one roll of plastic contains  $10 \text{ m}^2$ , how many rolls did the contractor need?
- A. 5
  - B. 6
  - C. 52
  - D. 140
3. In order to make a particular shade of green paint, Mary uses 24 parts of blue pigment, 12 parts of white, and 6 parts of yellow. What is the simplest ratio of these pigments?
- A. 4:2:1
  - B. 6:3:2
  - C. 12:6:3
  - D.  $1: \frac{1}{2}: \frac{1}{4}$



## THE PIZZA PLACE

Use the following information to answer question 4.



4. When Julie follows the streets and avenues, the shortest distance in kilometres that she could get from her house to the Pizza Place is
- A. 13.5
  - B. 2.70
  - C. 1.35
  - D. 0.8

5. Solve for  $n$  in the statement  $10n - 50 = 5c + 250$ , where  $n$  is the number of items bought and  $c$  is the price per item.
- A.  $n = \frac{1}{2}c + 30$   
B.  $n = 5c + 255$   
C.  $n = -60$   
D.  $n = -0.1c + 10$

### EXTRACURRICULAR ACTIVITIES

6. Nadia bowled five games and had an overall average of 205. Her scores on the first four games were 205, 203, 187, and 216. What was her score on the fifth game?
- A. 214  
B. 203  
C. 202  
D. 162

*Use the following information to answer question 7.*

A group of people are forming equal teams to play a game. When they form groups of 2, 3, 4, 5, or 6, there is always one person left.

7. What is the least number of people that could be in the group?
- A. 13  
B. 61  
C. 103  
D. 121



Use the following information to answer question 8.

In a survey, participants were asked the question, "What is your age?" The following data were obtained:

26, 22, 50, 35, 42, 21, 40, 24, 36, 48,  
46, 31, 27, 19, 20, 26, 25, 23, 26, 43

8. What is the range of the participants' ages?

- A. 26 years
  - B. 28 years
  - C. 31 years
  - D. 32 years
- 

### CONNECTIONS WITHIN MATHEMATICS

Use the following information to answer question 9.

When a load ( $L$ ) is hung on a spring, the spring stretches. The amount the spring stretches is called the extension ( $E$ ).

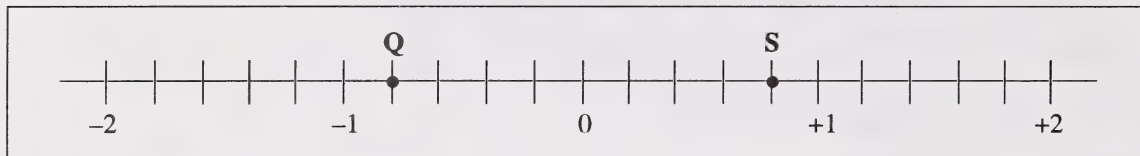
$L$ (kg)	0	1.2	2.0	3.2	4.8
$E$ (cm)	0	0.9	1.5	2.4	3.6

9. Which formula below shows the relationship between extension and load?

- A.  $E = \frac{4}{3}L$
- B.  $E = L - 1.2$
- C.  $E = L - 0.3$
- D.  $E = \frac{3}{4}L$

10. The 3-digit number  $2M3$  is added to 326 to give another 3-digit number,  $5N9$ . If  $5N9$  is divisible by 9, then  $M$  is
- A. 12
  - B. 6
  - C. 4
  - D. 2

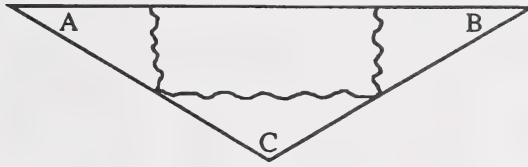
*Use the following information to answer question 11.*



11. The rational numbers located at points Q and S respectively are
- A.  $-0.8$  and  $+0.8$
  - B.  $-1.2$  and  $+0.8$
  - C.  $-1.2$  and  $+1.2$
  - D.  $-0.4$  and  $+0.4$
- 
12. Which statement is true?
- A.  $4^5 + 4^7 = 4^{12}$
  - B.  $4^{12} - 4^4 = 4^8$
  - C.  $4^2 \times 4^5 = 4^7$
  - D.  $4^5 \times 4^3 = 4^{15}$
13. About  $6\frac{1}{4}\%$  of the world's population lives in South America. Another way to express this percentage is
- A.  $\frac{1}{625}\%$
  - B.  $6.25\%$
  - C.  $625\%$
  - D.  $0.625\%$

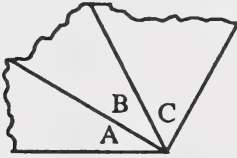
Use the following information to answer question 14.

The angles of a paper triangle were torn off as shown in this figure.

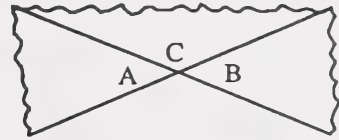


14. Which of the following diagrams **best** represents the sum of the angles?

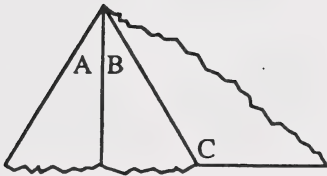
A.



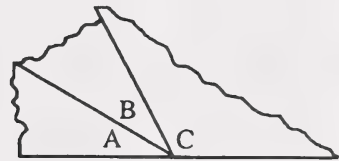
B.



C.



D.





15. Evaluate  $(c - b)^2 + (b - c)^2$ , where  $b = -2$  and  $c = 1$ .
- A. 81  
B. 18  
C. 2  
D. 0
16. A traffic light is red for 30 s, green for 25 s, and amber for 5 s in every minute. What is the probability that the colour is amber when a person first sees the traffic light?
- A.  $\frac{1}{6}$   
B.  $\frac{5}{12}$   
C.  $\frac{1}{11}$   
D.  $\frac{1}{12}$

**Practice Answer Sheet for Numerical-Response Questions**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
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<div>6</div> <div>6</div> <div>6</div> <div>6</div>	<div>6</div> <div>6</div> <div>6</div> <div>6</div>	<div>6</div> <div>6</div> <div>6</div> <div>6</div>	<div>6</div> <div>6</div> <div>6</div> <div>6</div>	<div>6</div> <div>6</div> <div>6</div> <div>6</div>
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## Numerical-Response Instructions

- Read each question carefully.
- When completing the test, you may use:  
calculator (recommended)  
eraser  
ruler  
scrap paper  
protractor
- Record your answer on the answer sheet provided by writing it in the boxes and filling in a circle in the corresponding column.
- Enter the **first digit** of your answer in the **left-hand box** and leave any unused boxes blank.
- Make sure that the number of the question on your answer sheet matches the number of the question you are answering.
- Use **only an HB** pencil to mark your answer.
- If you change an answer, **erase** your first mark **completely**.

### Example 1

Evaluate  $3^5$ .

$$3^5 = 3 \times 3 \times 3 \times 3 \times 3$$

$$= 243$$

Answer: 243

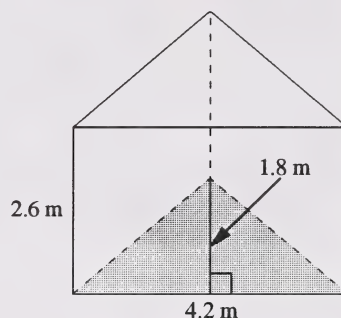
Record 243 on the answer sheet

2	4	3	
---	---	---	--

-	-		
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

### Example 2

Find the volume of this solid. (Round your answer to the tenth)



$$\text{Area of the base} = \frac{1}{2}bh$$

$$= \frac{1}{2} \times 4.2 \times 1.8$$

$$= 3.78$$

$$\text{Volume of the solid} = Bh$$

$$= 3.78 \times 2.6$$

$$= 9.828$$

Answer: 9.8

Record 9.8 on the answer sheet

9	.	8	
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-	-		
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9



### Numerical-Response Questions

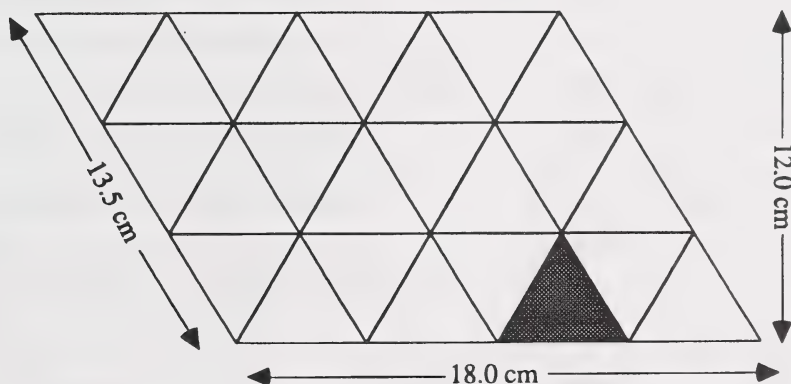
1. What is the simple interest earned on \$1600 for one year at  $5\frac{3}{4}\%$ ?

RECORD YOUR ANSWER IN THE NUMERICAL-RESPONSE  
SECTION OF THE ANSWER SHEET

2. Simplify  $(-3) \times 27 + (-3) \times 33$

RECORD YOUR ANSWER IN THE NUMERICAL-RESPONSE  
SECTION OF THE ANSWER SHEET

3. A patterned tile is made in the shape of a parallelogram, as shown below. On this tile, there is a pattern made up of equilateral triangles, one of which is shaded.



What is the area in square centimetres of the shaded equilateral triangle?

RECORD YOUR ANSWER IN THE NUMERICAL-RESPONSE  
SECTION OF THE ANSWER SHEET

## Key and Descriptors for Sample Questions

### Multiple-Choice Questions

Ques. No.	Key	Program Strand*	Reporting Category**	Curriculum Standard
1	A	RP	K	Select a strategy to find the volume of a set of rectangular prisms
2	B	MG	S	Determine the area of an irregular shape
3	B	MG	S	Express three components of a ratio in its simplest form
4	C	RP	S	Apply measurement skills and use a scale to calculate distances
5	A	A	K	Manipulate the given formula to change the subject of the formula
6	A	A	S	Apply the meaning of average to solve a practical problem
7	B	NO	S	Apply lowest common multiple in problem solving
8	C	DM	K	Recall the meaning of range and calculate it
9	D	A	S	Establish a formula that shows the relationship shown in a table
10	D	NO	S	Use divisibility rules and computation to find a numeral
11	A	NO	S	Relate rationals and points on a number line
12	C	NO	S	Apply the laws of exponents
13	B	RP	S	Convert percent to a fraction or decimal
14	D	MG	K	Recognize sum of the angles of a triangle represented pictorially
15	B	A	S	Evaluate an expression using substitution
16	D	DM	S	Determine a strategy to calculate probability given data from practical situation

### Numerical-Response Questions

Ques. No.	Key	Program Strand*	Reporting Category**	Curriculum Standard
NR1	92	NO	K	Calculate simple interest using a fractional percent rate
NR2	891	RP	S	Apply the order of operations for multiplication and division using integers
NR3	9	MG	K	Calculate the area of a parallelogram or triangle

\* A—Algebra; DM—Data Management; MG—Measurement and Geometry; NO—Number Systems and Operations; RP—Ratio and Proportion

\*\* K—Knowledge; S—Skills

# ***Preparing Students for the Assessment***

We hope that teachers will share the following information with their students to help them prepare for the Grade 9 Mathematics Achievement Test.

## ***Suggestions for Answering Multiple-Choice Questions***

The questions in the assessment are integrated into narrative themes.

Use information given by

- looking at all the information and thinking carefully about it before you try to answer the questions or
- reading the questions first and then looking at the information, remembering the questions you need to answer

When you need information for more than one question, remember to *go back to the information before answering each question*.

*Make sure you look at all types of information given.* Information may be given in words, charts, pictures, graphs, and maps.

*Check your work when you calculate an answer,* even when your answer is one of the choices.

When answering questions, *choose the answer you think is best.* If you don't see a correct or best answer right away, try to find the two choices that seem closest to the correct answer and choose one of them.

## ***Suggestions for Answering Numerical-Response Questions***

*Make sure you look at all the information given.*

Calculate your answer and check your work before entering the answer on the answer sheet.



# Alberta Education Contact

Questions or comments regarding this bulletin should be directed to:

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FAX: 403-422-3206  
E-Mail: [Kmelville@edc.gov.ab.ca](mailto:Kmelville@edc.gov.ab.ca)

To call toll-free from outside of  
Edmonton, dial 310-0000.





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